

United States Environmental Protection Agency Washington, DC 20460						Work Assignment Number: 1-40 <input checked="" type="radio"/> Original <input type="radio"/> Amendment			
Work Assignment									
Contract Number: EP-C-09-027			Contract Period 04/01/2010 - 03/31/2011 Option Period No. 1			SF Site Name:			
Title of Work Assignment: Mobile monitoring to quantify the impacts of roadway design on near-road air quality									
Suggested Source: Arcadis						Specify Section & Paragraph of Contract SOW: 4.0 Process Sampling and Monitoring; and 7.0 Off-Site Research			
Purpose: <input checked="" type="radio"/> Work Assignment Initiation <input type="radio"/> Work Assignment Close-Out <input type="radio"/> Work Assignment Amendment <input type="radio"/> Incremental Funding <input type="radio"/> Work Plan Approval						Period of Performance From: 04/01/2010 To: 03/31/2011			
Comments: Continuation of Arcadis Contract EP-C-09-027, Base Period WA #0-40; OMIS #20925 <i>Gayle Hagler is the alternate WAM.</i>						Category (check one) <input type="radio"/> I Enforcement <input type="radio"/> II Standard Setting <input type="radio"/> III Technology Development <input checked="" type="radio"/> IV Proof of Concept <input type="radio"/> N/A			
<i>Note: To report additional accounting and appropriations data use EPA Form 1900-69A.</i>									
SFO 22 <input type="checkbox"/> Superfund (Max 2)			Accounting and Appropriations Data						<input checked="" type="checkbox"/> Non-Superfund
DCN (Max 6)	Budget/FYs (Max 4)	Appropriation Code (Max 6)	Budget Org/Code (Max 7)	Program Element (Max 9)	Object Class (Max 4)	Amount	Sites/Project (Max 8)	Cost Org/Code (Max 7)	
1									
2									
3									
4									
5									
Authorized Work Assignment Ceiling									
Contract Period:			Cost/Fee			LOE			
Previously Approved			New						
This Action									
Total									
Work Plan / Cost Estimate Approvals									
Contractor WP Dated:			Cost/Fee:			LOE:			
Cumulative Approved:			Cost/Fee:			LOE:			
Work Assignment Manager Name			Richard Baldauf			Branch / Mail Code			
<i>R. Baldauf</i> (Signature)			3/11/2010 (Date)			ECPB / E343-02			
Branch Chief Name			Richard C. Shores, Chief, ECPB			Branch/Mail Code			
<i>Richard Shores</i> (Signature)			3-11-2010 (Date)			ECPB / E343-02			
Project Officer Name			Diane Pierce			Branch/Mail Code			
<i>Diane L. Pierce</i> (Signature)			3-26-10 (Date)			TSB / E343-03			
Contracting Official Name			Renita Tyus, CO			Branch/Mail Code			
<i>Renita Tyus</i> (Signature)			3/29/10 (Date)			CPOD			
Contractor Acknowledgement of Receipt and Approval of Workplan (Signature and Title)						Date			

Work shall not begin on this work assignment until 04/01/10.

Statement of Work

Mobile monitoring to quantify the impacts of roadway design on near-road air quality

1.0 Background:

The U.S. Environmental Protection Agency (EPA) and the Federal Highway Administration (FHWA) have entered into a collaboration to assess the impacts of traffic emissions and meteorology on local air quality. The EPA/FHWA collaboration will measure criteria and air toxic pollutant concentrations at fixed-site locations at varying distances along a perpendicular transect away from a major interstate highway for one calendar year. A transect monitoring arrangement will be located in Detroit, Michigan during the 2010 calendar year.

Recent research by the EPA suggests that roadway design, including the presence of vegetation, may affect concentrations of traffic-generated pollutants away from the road. The goal of this project is to expand our understanding of the effects of vegetation and other roadway design features on near-road and on-road air quality.

2.0 Task and Method Overview

The contractor shall execute a one (1) month field monitoring study to measure particulate matter (PM) and carbon monoxide (CO) on and near a large highway in Detroit, Michigan. This field study will be conducted over a continuous one month period during the months of August and/or September, 2010 at sites to be selected by the WA COR.

This study will include the deployment of up to two mobile monitoring vehicles equipped with air monitoring and meteorology equipment. One vehicle will operate as an easily relocated stationary sampling site, providing power to CO, NO/NO₂, and PM instruments using on-board batteries to avoid any self-pollution from internal combustion engine emissions. The vehicle will be situated to provide measurements alongside roadways in areas with differing roadway design and topographic features. The second, all-electric vehicle shall be deployed to conduct real-time mapping of PM, NH₃, and CO by repeatedly driving a specified route at the study site. These two vehicles are already on the ARCADIS contract and available for use in this study – a standard Ford SUV equipped with an onboard battery power supply and the Geospatial Monitoring of Air Pollution (GMAP) electric car to support real-time air pollution mapping. EPA will also provide a trailer to transport the GMAP vehicle to and from the site in Detroit, if deemed necessary by the WA COR.

3.0 Description of Tasks:

Task 1. Site Selection and Preparation:

The contractor shall visit the selected monitoring sites in coordination with EPA personnel as required for the purpose of evaluating field sampling deployments. Final site selection will be determined by the EPA WA COR.

Task 2. Technical and Safety Support for the Electric Vehicle

The GMAP vehicle is an electric vehicle specially customized to support onboard sampling. Given its limited driving range and specialized design, contractor support shall provide general vehicle support and vehicle transportation to field sites. The contractor shall update and implement the safety plan for field deployment activities involving the GMAP vehicle. The safety plan was developed for previous studies, and includes emergency response protocols in the event that the GMAP vehicle loses power while driving on a highway or arterial road. In addition, a multi-year technical support agreement is in place to ensure that the vehicle manufacturer will provide on-site troubleshooting in the event of significant vehicle performance issues during a field campaign.

Deliverable 2.1: Contractor shall submit an updated GMAP vehicle safety plan for the Detroit location to the EPA WA COR prior to initiating field measurements and provide general vehicle support.

Deliverable 2.2: Contractor shall provide a signed agreement for technical support from the GMAP vehicle manufacturer through at least three months after the proposed completion date for this project in the contractor's project workplan, to be completed prior to initiating field measurements. This agreement shall include in-person support during domestic deployments.

Task 3. Mobile Monitoring Instrumentation Support

The contractor shall conduct mobile monitoring instrumentation support activities prior to deployment to the field, including measurement intercomparison tests, instrument calibration and maintenance, and development work to improve measurement accuracy. These work activities include, but are not limited to, intercomparison activities of black carbon instrumentation and NH_3 measurement using a quantum cascade laser. The contractor shall conduct a one-week intercomparison of black carbon monitoring instrumentation sampling while on-board a mobile monitoring vehicle in motion. In addition, the contractor shall improve the joint CO/NH_3 quantum cascade laser monitoring capability through the development of an appropriate sampling inlet and collecting NH_3 data during a four-week NH_3 intercomparison study that will be located on the EPA campus in the summer (June/July). EPA will be responsible for the preparation of Category III Quality Assurance Project Plans (QAPPs) to support these intercomparison activities. Work involving environmental data shall not commence until the QAPP has received official approval from the EPA Quality Assurance Staff.

Deliverable 3.1: The contractor shall provide raw timestamped black carbon intercomparison data to the EPA WA COR, within one week of sampling completion.

Deliverable 3.2: The contractor shall provide quantum cascade laser data (CO, NH₃), including any necessary post-processing, to the EPA WA COR within two months of intercomparison sampling completion.

Task 4. Field Measurements:

Following the completion of Tasks 1 and 2, the contractor shall execute a four-week field monitoring study to measure particulate matter and carbon monoxide nearby a major roadway under various configurations (vegetation and other roadway design features). Field sampling shall be conducted for approximately 4 hours each day, overlapping the morning commute period. In addition to the monitoring period, transportation, set-up, break-down, and data storage are estimated to take approximately 4 hours per sampling day. The field sampling configurations and quality assurance requirements will be described in a Category III QAPP which will be provided by the EPA WA COR. This QAPP will adhere to NRMRL QAPP requirements for measurement projects (see Attachment #1 to this statement of work). After preparation, the QAPP shall be reviewed and approved by the ARCADIS work assignment leader and QA officer. Once it has obtained their approval, it shall be submitted to the EPA QA staff for review and approval. It shall be accompanied by a signature page that is signed by the ARCADIS work assignment leader and QA officer to show that they have reviewed and approved the QAPP. It is the responsibility of the ARCADIS work assignment leader to document this process. Upon receipt of the signed QAPP, the EPA work assignment manager and QA manager will review and approve the QAPP and they will add their signatures to the signature page. Work involving environmental data shall not commence until the QAPP has received official approval from the EPA Quality Assurance Staff. In the event that inclement weather or other unavoidable circumstances prevent field sampling, a sampling day may be cancelled and rescheduled to meet the target of 24 sampling days for the study.

Each sampling day, the contractor will be responsible for transporting all vehicles and equipment to and from the site. The contractor will identify an appropriate site for vehicle and equipment storage and re-charging within a 20-mile radius of the project site. The contractor shall prepare for and conduct measurements of PM and CO onboard the stationary monitoring vehicle (i.e. Ford SUV). In addition to the collection of air monitoring data, the contractor shall also prepare for and collect local meteorology measurements throughout each sampling period and document roadway properties. The contractor shall also collect video of highway and any adjacent road activities for the stationary vehicle monitoring, as well as video from the electric vehicle during mobile data collection. The field sampling campaign will be manned with personnel with sufficient expertise to ensure a minimum 80% completeness Data Quality Objective, as described in the QAPP which is to be provided by the EPA WA COR.

Deliverable 4.1: The contractor shall provide raw timestamped concentration and meteorology data to the EPA WA COR (e.g. upload to a shared file folder or e-mailed to the EPA WA COR) within 3 days of data collection. The data to be reported and formatting will be described in the QAPP.

Deliverable 4.2: The contractor shall provide a complete data package (DP) for the study within 4 weeks of field monitoring completion. The DP shall include field notes, quality-assured field data, in-field quality indicators, calibration checks (to be outlined in the QAPP), and video. No contractor-generated report will be required as a deliverable.

ATTACHMENT #1 TO THE STATEMENT OF WORK (SOW) FOR MEASUREMENT PROJECTS

NRMRL Quality Assurance (QA) Requirements

In accordance with EPA Order 5360.1 A2, conformance to ANSI/ASQC E4 must be demonstrated by submitting the quality documentation specified herein. All quality documentation shall be submitted to the Government for review. The Government will review and return the quality documentation, with comments, and indicate approval or disapproval. If the quality documentation is not approved, it must be revised to address all comments and shall be resubmitted to the Government for approval. Work involving environmental data collection, generation, use, or reporting shall not commence until the Government has approved the quality documentation. The quality documentation shall be submitted to the Government at least thirty (30) days prior to the beginning of any environmental data gathering or generation activity in order to allow sufficient time for review and revisions to be completed. After the Government has approved the quality documentation, the Contractor shall also implement it as written and approved by the Government. Any EPA-funded project/program may be subject to a QA audit.

TO BE SUBMITTED PRE-AWARD (mark all that apply):

☐ **NRMRL's Quality System Specifications:**

- (1) a description of the organization's Quality System (QS) and information regarding how this QS is documented, communicated and implemented;
- (2) an organizational chart showing the position of the QA function;
- (3) delineation of the authority and responsibilities of the QA function;
- (4) the background and experience of the QA personnel who will be assigned to the project; and
- (5) the organization's general approach for accomplishing the QA specifications in the SOW.

- ☐ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001,
<http://www.epa.gov/quality/qs-docs/r2-final.pdf>

TO BE SUBMITTED POST-AWARD (mark all that apply):

☐ **NRMRL's Quality System Specifications:**

- (1) a description of the organization's Quality System (QS) and information regarding how this QS is documented, communicated and implemented;
- (2) an organizational chart showing the position of the QA function; 07/14/08 A-2
- (3) delineation of the authority and responsibilities of the QA function;
- (4) the background and experience of the QA personnel who will be assigned to the project; and
- (5) the organization's general approach for accomplishing the QA specifications in the SOW.

- ☐ **Quality Management Plan:** prepared in accordance with R-2 - EPA Requirements for Quality Management Plans (EPA/240/B-01/002) March, 2001,
<http://www.epa.gov/quality/qs-docs/r2-final.pdf>

- ☐ **Category I or II Quality Assurance Project Plan (QAPP):** prepared in accordance with R-5 - EPA Requirements for QA Project Plans (EPA/240/B-01/003) March, 2001
<http://www.epa.gov/quality/qs-docs/r5-final.pdf>

- ☒ **Category III or IV QAPP:** prepared in accordance with applicable sections of the following NRMRL QAPP Requirements List(s) which is(are) included in this attachment:

X QAPP Requirements for Measurement Projects

- ☐ **QAPP Requirements for Secondary Data Projects**
- ☐ **QAPP Requirements for Research Model Development and/or Application Projects**
- ☐ **QAPP Requirements for Software Development Projects**
- ☐ **QAPP Requirements for Method Development Projects**
- ☐ **QAPP Requirements for Design, Construction, and/or Operation of Environmental Technology Projects**

ADDITIONAL QA RESOURCES:

EPA's Quality System Website: <http://www.epa.gov/quality/>

EPA's Requirements and Guidance Documents: http://www.epa.gov/quality/qa_docs.html

NRML QAPP REQUIREMENTS FOR MEASUREMENT PROJECTS

GENERAL REQUIREMENTS:

Include cover page, distribution list, approvals, and page numbers.

0. COVER PAGE

Include the Division/Branch, project title, revision number, EPA technical lead, QA category, organization responsible for QAPP preparation, and date.

1. PROJECT DESCRIPTION AND OBJECTIVES

- 1.1 Describe the process and/or environmental system to be evaluated.
- 1.2 State the purpose of the project and list specific project objective(s).

2. ORGANIZATION AND RESPONSIBILITIES

- 2.1 Identify all project personnel, including QA, and related responsibilities for each participating organization, as well as their relationship to other project participants.
- 2.2 Include a project schedule that includes key milestones.

3. SCIENTIFIC APPROACH

- 3.1 Describe the sampling and/or experimental design that will be used to generate the data needed to evaluate the projective objective(s). A description of the design should include the types and numbers of samples (including QC and reserve samples), the design of the sampling network, sample locations and frequencies, and the rationale for the design.
- 3.2 Identify the process measurements (e.g., flow rate, temperature) and specific target analyte(s) for each sample type.
- 3.3 Describe the general approach and the test conditions for each experimental phase.

4. SAMPLING PROCEDURES

- 4.1 Describe any known site-specific factors that may affect sampling procedures as well as all site preparation (e.g., sampling device installation, sampling port modifications, achievement of steady-state) needed prior to sampling.
- 4.2 Describe or reference each sampling procedure (including a list of equipment needed and the calibration of this equipment as appropriate) to be used. Include procedures for homogenizing, compositing, or splitting of samples, as applicable.
- 4.3 Provide a list of sample containers, sample quantities to be collected, and the sample amount required for each analysis, including QC sample analysis.
- 4.4 Specify sample preservation requirements (e.g., refrigeration, acidification, etc.) and holding times.
- 4.5 Describe the method for uniquely numbering each sample.
- 4.6 Describe procedures for packing and shipping samples, including procedures to avoid cross-contamination, and provisions for maintaining chain-of-custody (e.g., custody seals and records), as applicable.

5 MEASUREMENT PROCEDURES

- 5.1 Describe in detail or reference each process measurement or analytical method to be used. If applicable, identify modifications to EPA-approved or similarly validated methods.
- 5.2 If not provided in Section 5.1 or the referenced method, include specific calibration procedures, including linearity checks and initial and continuing calibration checks.

6 QUALITY METRICS (QA/QC CHECKS)

- 6.1 For each process measurement and analytical method, identify the required QC checks (e.g., blanks, control samples, duplicates, matrix spikes, surrogates), the frequencies for performing these checks, associated acceptance criteria, and corrective actions to be performed if acceptance criteria are not met.
- 6.2 Any additional project-specific QA objectives (e.g., completeness, mass balance) shall be presented, including acceptance criteria.

7 DATA ANALYSIS, INTERPRETATION, AND MANAGEMENT

- 7.1 Identify the data reporting requirements, including data reduction procedures specific to the project and applicable calculations and equations.
- 7.2 Describe data validation procedures used to ensure the reporting of accurate project data.
- 7.3 Describe how the data will be summarized or analyzed (e.g., qualitative analysis, descriptive or inferential statistics) to meet the project objective(s).
 - 7.3.1- If descriptive statistics are proposed, state what tables, plots, and/or statistics (e.g., mean, median, standard error, minimum and maximum values) will be used to summarize the data.
 - 7.3.2- If an inferential method is proposed, indicate whether the method will be a hypothesis test, confidence interval, or confidence limit and describe how the method will be performed.
- 7.4 Describe data storage requirements for both hard copy and electronic data.

8 REPORTING

- 8.1 List and describe the deliverables expected from each project participant responsible for field and/or analytical activities.
- 8.2 Specify the expected final product(s) that will be prepared for the project (e.g., journal article, final report).

9. REFERENCES

Provide references either in the body of the text as footnotes or in a separate section.